

The NICHD Connection

June 2019

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EDITOR IN CHIEF

Shana R. Spindler, PhD
Shana.Spindler@gmail.com

LAYOUT & DESIGN

Nichole Swan

BACKGROUND PHOTOGRAPHY

See [Credits page](#) online

CONTRIBUTORS

Suna Gulay, PhD

Distinct Use of Communication Machinery in the Developing Brain

By Shana R. Spindler, PhD

Neuroscientists have spent decades studying the anatomy and physiology of the adult brain, by carefully mapping each layer of specialized tissue and poking the delicate assembly of axons and dendrites. But now scientists at the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development have turned their attention toward the prenatal stages of development, to decipher why specialized neuron communication machinery is present even before brain circuits have formed.

In a recent issue of *Science Reports*, Dr. Gülcan Akgül and her colleagues in the laboratory of Dr. Chris McBain report a novel role for this communication machinery (an assembly of protein subunits known as AMPA receptors) during mouse prenatal brain development. AMPA receptors have a known role in neuron communication in the adult brain, but Dr. Akgül's study found that the receptors are also required during the formation of neural circuits—specifically, in inhibitory interneurons.

As their name suggests, inhibitory interneurons can dampen signaling between neurons, controlling how and when information gets routed through the brain. Think of the brain like traffic, urged Dr. Akgül. We use red lights and yield signs to govern car movement on roads, and the brain uses inhibitory interneurons to control information flow through neural circuits. "If interneurons don't have [AMPA receptors], it's very hard for [the interneurons] to get excited enough to fire an action potential to provide inhibition into the brain," Dr. Akgül explained, but she then became most excited about AMPA receptor's early role during embryonic stages.



Dr. Gülcan Akgül is an assistant research professor at the University of Connecticut. Prior to her current position, she completed a five-year postdoctoral fellowship in the laboratory of Dr. Chris McBain at NICHD.

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Letter from the Editor

In honor of *The NICHD Connection's* nine year anniversary, I want to share an experience I had at the April Director's brown bag coffee.

NICHD Director Dr. Diana Bianchi sat at the circular arrangement of tables hosting nearly 40 NICHD staff and scientists. She was about to share her experience testifying before the House Labor/HHS Appropriations Subcommittee on April 2, but first donned a pair of darkly tinted shades—having left her standard prescription glasses in the car. Looking like a rock star, she exclaimed “Everyone should feel good!” Dr. Bianchi clearly considered the congressional hearing a success.

While we listened to her stories about questions from the subcommittee, what struck me most were her comments about the overwhelming support for biomedical research. She relayed the sense of hope that NIH provides to the Congress members' constituents, and in some cases their own personal lives, upon hearing the descriptions of NICHD work. “So much of it is educating the members [of Congress] about what we do,” she explained. As we continued the brown bag meeting, I couldn't help but feel the excitement of listening to the strategic planning that could affect the direction

and funding of child health and human development research on a large scale.

In light of the impactful research of our fellows, this month we are focusing on just that: your research. Former fellow Dr. Gülcan Akgül's work on inhibitory interneurons in the mouse hippocampus can be found on [the front page](#), and several Three-minute-Talk (TmT) finalists and semifinalists have offered a three-sentence [recap](#) of their work.

To round out our anniversary issue, we introduce our [new NICHD fellows](#), relay important updates in Dr. Suna Gulay's “[Rep Report](#),” and present the [June Announcements](#) and [Events](#), including upcoming 2019 summer training opportunities.

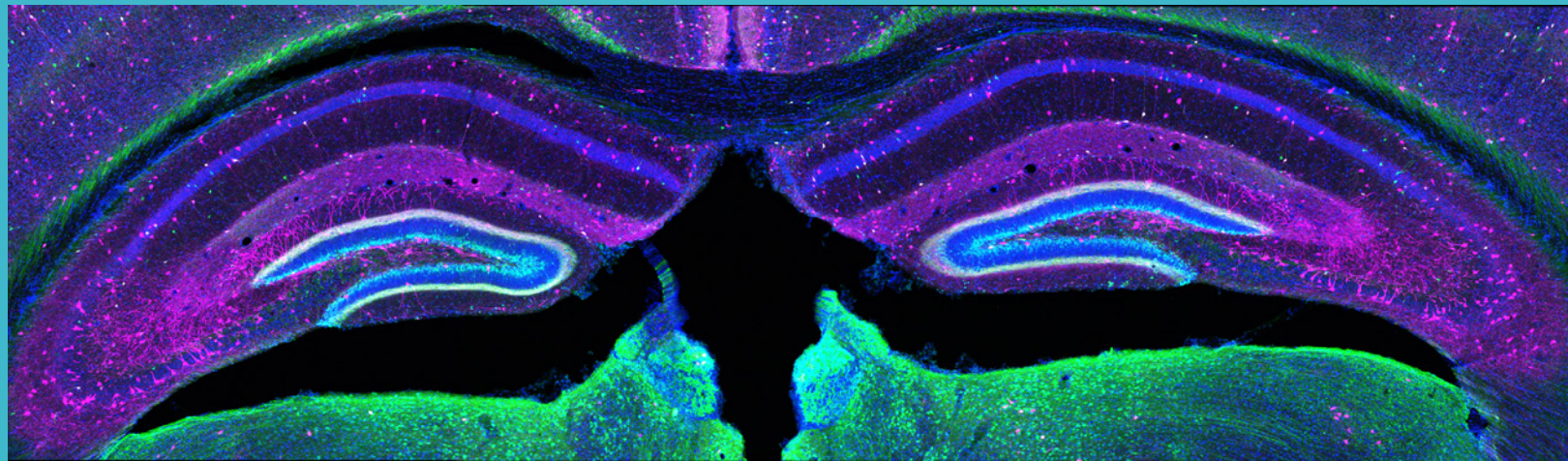
Thank you to all of the fellows who have helped make these nine years of *The NICHD Connection* such an enjoyable experience. I look forward to another year ahead!

Your Editor in Chief,
Dr. Shana R. Spindler, PhD

Please send questions, comments, and ideas to our editor at Shana.Spindler@gmail.com.

Distinct Use of Communication Machinery in the Developing Brain

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Mouse hippocampus with an interneuron subgroup labeled and DAPI stained. Credit: Gülcan Akgül, NICHD

To study AMPA receptors in prenatal mice, Dr. Akgül and her colleagues created conditional knock-out mice, a form of genetic trickery that deletes AMPA receptor subunits in inhibitory interneurons at an early developmental time point.

Dr. Akgül found that AMPA receptors affect how inhibitory interneurons survive and mature. Inhibitory interneurons lacking AMPA receptor subunits differed from normal mice in the number of interneuron subtypes produced, increasing some types but decreasing others. The inhibitory interneurons also failed to form expected communication contacts with surrounding neurons, which affected their ability to provide inhibition to the circuit.

These cellular changes might have implications on learning a behavior later in life. A series of behavioral tests on the knock-out mice uncovered problems with anxiety, learning, and social interactions. To Dr. Akgül's surprise, the disruption of inhibitory interneuron activity did not lead to epilepsy, as she had hypothesized. She posits that a compensation mechanism might exist to prevent uncontrolled neural activity, given the cellular changes they observed.

In the larger context, Dr. Akgül hopes her work will give scientists a new angle to understand neural activity from a developmental point of view. This study highlights the distinct uses of communication machinery during prenatal and postnatal stages. But of greater significance, Dr. Akgül concluded that a developmental approach "gives scientists insight into how to look at neurological disorders from a different perspective."

REFERENCES

Akgül G, Abebe D, Yuan XQ, Auville K, McBain CJ. "The Role of AMPARs in the Maturation and Integration of Caudal Ganglionic Eminence-Derived Interneurons into Developing Hippocampal Microcircuits." *Scientific Reports*. (2019) 9:5435.



Congratulations to the 2019 NICHD TmT Finalists and Semifinalists

The Three-minute Talks (TmT) competition is an annual science communication program at the NIH. The competition fosters an environment for fellows to convey their research in a concise and meaningful way to a broad scientific audience. On May 8, 2019, the NICHD held an internal competition to select a set of finalists for the NIH-wide TmT event.

Please join us in congratulating the 2019 NICHD TmT awardees:

NICHD AWARDEES

Aparna Ajjarapu (Postbac, Epidemiology Branch, DIPHR)
Jenna Kanner (Postbac, Epidemiology Branch, DIPHR)
Ross Kaufhold (Postbac, Dasso lab, DIR)
Feng Li (Postdoc, Levin lab, DIR)
Mengying Li (Postdoc, Epidemiology Branch, DIPHR)

This year, several of the 2019 NICHD TmT participants have offered to recap their Three-minute-Talk research in a three sentence sum-up. Check them out below!

Aparna Ajjarapu

Women with a history of gestational diabetes (GDM) are at an increased risk for later renal impairment, and finding dietary factors that could promote kidney health among this high risk population is important. Nuts are rich in nutrients that could promote kidney health, and our study aimed to investigate the associations between nut intake and renal function among women with prior GDM. Findings from our study suggest that two to three servings of nuts per week may promote kidney health among women with prior GDM.

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Congratulations to the 2019 NICHD TmT Finalists and Semifinalists

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Jenna Kanner

Temperature changes profoundly affect pregnant women and their offspring, leading to outcomes such as preterm birth and low birth weight. The risk factors for stillbirth, a prevalent and preventable outcome of pregnancy, are not fully investigated, but studies suggest a relationship between stillbirth and temperature. Using a time-stratified case crossover design, we found that the risk of stillbirth increases between six to eight percent for every additional one degree Celsius during the week prior to delivery.

Ross Kaufhold

The nuclear pore complex (NPC) is a massive protein complex that facilitates the transport of cargo between the nucleus and cytoplasm. The protein components of the NPC, called nucleoporins, have roles in both cell division and nuclear transport. We are using CRISPR/Cas9 and a novel degron system to quickly degrade individual nucleoporins and characterize each protein's specific roles in nuclear transport and cell division.

Feng Li

The fatal virus HIV-1 is able to insert its genome into the host DNA without integrase, which is the core viral factor catalyzing the integration process. We used a retrotransposon Tf1 in fission yeast as a powerful model for HIV replication. By studying the integration profile of Tf1 lacking integrase, we saw for the first time that the integrase-independent insertions are mediated by homologous recombination.

Mengying Li

My research examines gestational diabetes and its consequences on women and children's health over the life span. I conduct my research by designing population-based studies and analyzing the data to elucidate determinants of health outcomes. I am particularly focused on modifiable factors such as nutrition, which may be targeted by public health interventions.

Mai-Han Trinh (Semi-Finalist)

Research has shown that screen media time harms child development, but few longitudinal studies in the US have examined factors related to screen use among children under three years. Using the Upstate KIDS Study, we found that a range of sociodemographic characteristics, like childcare type and parental education, predict children's screen time. Importantly, screen time habits are established from as early as infancy and persist over childhood, emphasizing the need for earlier interventions.

The Rep Report

By Suna Gulay, PhD

As the current NICHD Basic Sciences Institutes and Centers (IC) Representative, I represent NICHD postdoctoral fellows at the Fellows Committee (FelCom) meeting every month and share the latest news with you here. Do you have a concern or question that you want brought up at the next meeting? Contact me at suna.gulay@nih.gov!



Hello NICHD postdocs,

Dr. Michael Gottesman, NIH Deputy Director for Intramural Research, spoke at the May FelCom meeting to address [the recent security issues involving foreign national visitors on campus](#). Dr. Gottesman explained that there has been an HHS policy in place since 2011 requiring pre-clearance of foreign nationals from the four countries declared as state sponsors of terrorism by the Department of State (Iran, North Korea, Syria, Sudan).

However, this policy has not been well communicated, and only after a recent update, the computer system started requiring the country of origin be indicated for visitors. This led to a non-US citizen graduate student getting escorted off of the NIH campus during his postdoctoral position interview, and another non-US citizen visitor missing the first day of a meeting that was held at NIH because of clearance issues.

Dr. Gottesman expressed his deepest apologies for these incidents, and he explained that NIH is reviewing procedures to ensure all guests are treated with respect and NIH staff understand their responsibilities in handling the necessary pre-clearance requirements before visitors arrive. An email will be out soon to clarify the policies on foreign national visitors of NIH.

To receive the monthly minutes of FelCom meetings, subscribe to the FELLOW-L listserv! To learn more about how FelCom is helping the NIH postdoctoral community, join a meeting! **We meet every first Thursday of the month at 4:00 p.m. in Building 1, Wilson Hall.** The next meeting will take place on August 1, 2019.

Have a productive and delightful month!

Meet Our New Fellows

We are happy to welcome new fellows to the NICHD family. If you arrived recently to the NICHD and would like us to introduce you in our quarterly “Meet Our New Fellows” column, please contact our editor, Dr. Shana Spindler, at Shana.Spindler@gmail.com.



HYO WON AHN
Postdoctoral Fellow

Hometown: South Korea
PhD institution: University of Georgia
NICHD mentor: Dr. Henry Levin
Area of research: I study the impact of retrotransposons in neurological diseases.



LEAH JOY GREENSPAN
Postdoctoral Fellow

Hometown: North Babylon, New York
PhD institution: Johns Hopkins University, School of Medicine
NICHD mentor: Dr. Brant Weinstein
Area of research: I study the cellular dynamics and molecular mechanisms that drive endothelial regeneration after injury in Zebrafish blood vessels.



HYUNGCHUL LEE
Postdoctoral Fellow

Hometown: Busan, South Korea
PhD institution: Korea University, Seoul, South Korea
NICHD mentor: Dr. Karl E. Pfeifer
Area of research: I study H19 function in myotube differentiation.

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Meet Our New Fellows

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RAKESH KUMAR PATHAK

Postdoctoral Fellow

Hometown: Rewa, India

PhD institution: VP Chest Institute, Delhi University, Delhi, India

NICHD mentor: Dr. Henry Levin

Area of research: I study the molecular mechanism involved in the genome-wide binding of LEDGF/p75, a chromatin binding factor that positions the integration of HIV1. We examine the role of LEDGF/p75 in genome-wide transcription using the HEK293T cells.



HEMANT KUMAR PRAJAPATI

Postdoctoral Fellow

Hometown: Jaipur, Rajasthan, India

PhD institution: IIT Bombay

NICHD mentor: Dr. David Clark

Area of research: I am studying the mechanism behind genome accessibility using budding yeast as a model organism.



ANNA DOROTHEA SENFT

Postdoctoral Fellow

Hometown: Mannheim, Germany

PhD institution: University of Oxford, UK

NICHD mentor: Dr. Todd Macfarlan

Area of research: I explore roles of zinc finger proteins and endogenous retroviruses during early embryonic and extra-embryonic cell fate specification in mammals.



CHELSE TEMMEN

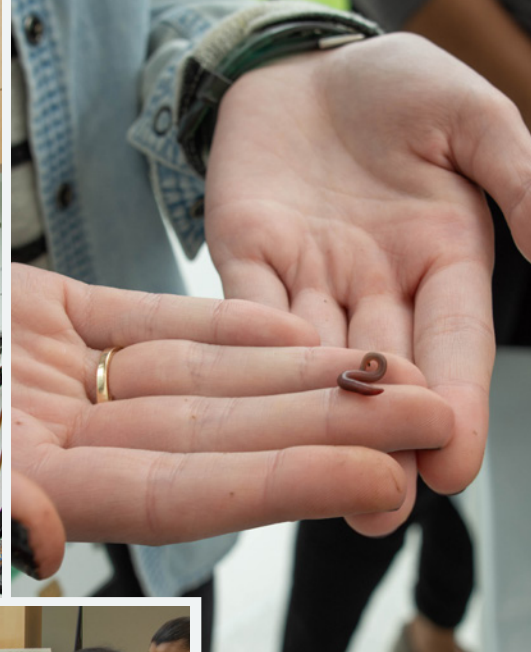
Postdoctoral Fellow

Hometown: Westphalia, Missouri

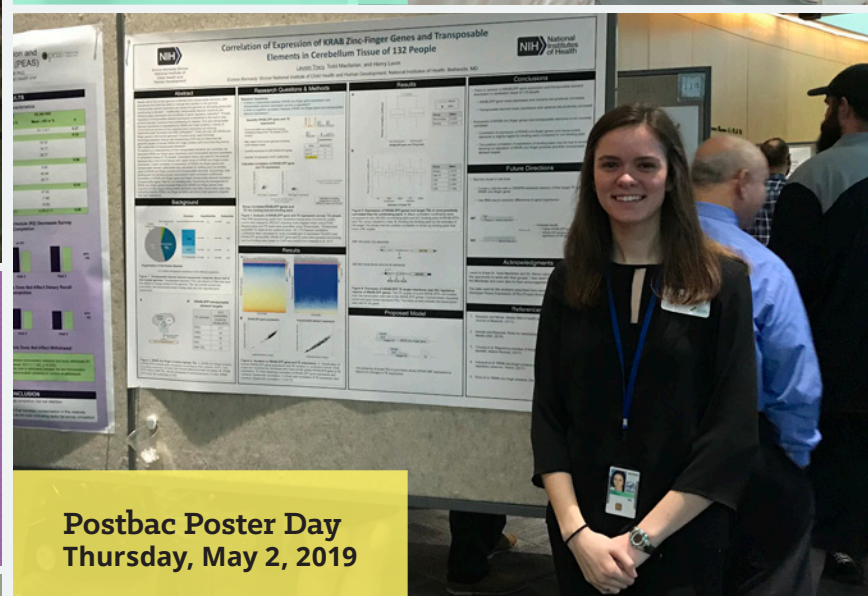
PhD institution: University of Nebraska-Lincoln

NICHD mentor: Dr. Bruce Simons-Morton

Area of research: I study how social and contextual factors influence adjustment and the development of risk-taking behaviors during adolescence and early adulthood.



NIH Earth Day
Thursday, April 25, 2019

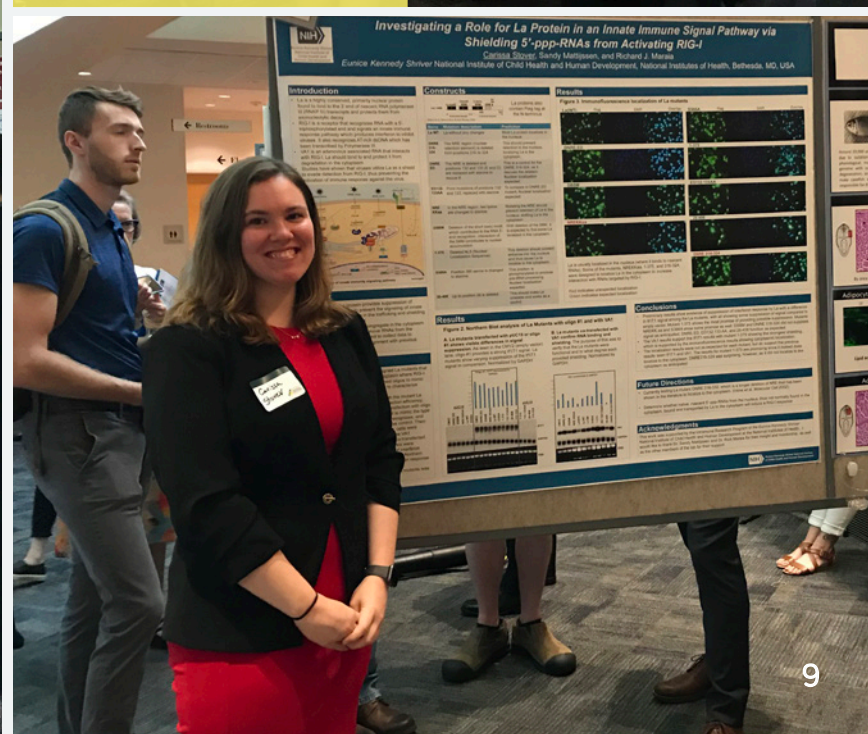
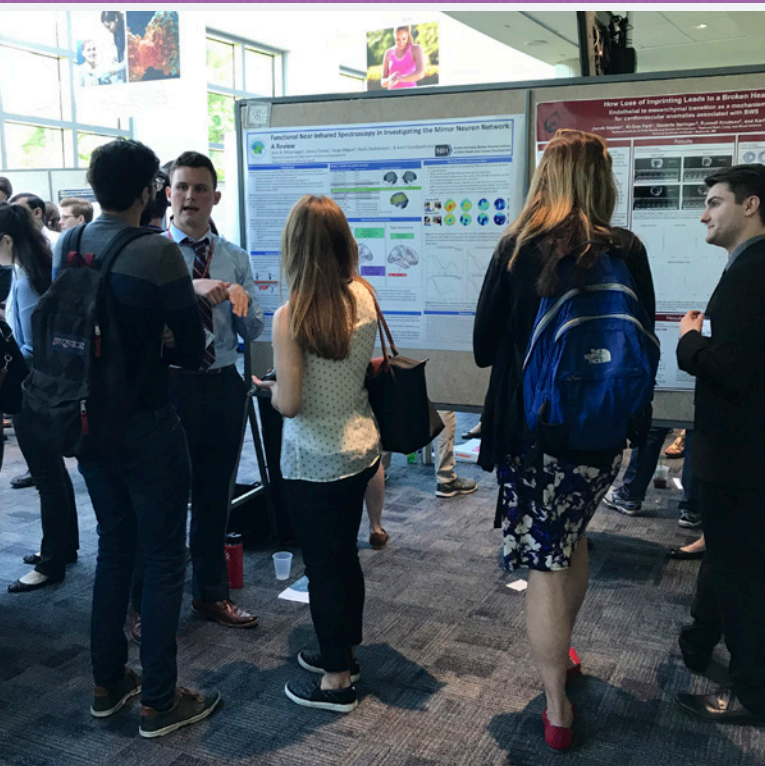


Postbac Poster Day
Thursday, May 2, 2019

Life Outside Lab

April Earth Day & May Postbac Poster Day

for more photos, visit newsletter.nichd.nih.gov



Upcoming NIH-Wide Office of Intramural Training and Education (OITE) Events

For more information and registration, please visit [Upcoming OITE Events](#).

OITE Orientation for Graduate Students and Postdoctoral Fellows (June 4)

Planning a Successful NIH Summer Internship (June 7, 14 & 21)

Speaking Up: How to Ask for What You Need in the Lab and in Life (June 11)

Essential Leadership Skills for Future Scientists and Health Care Professionals (June 12)

Workplace Dynamics I/II: Self-Awareness, the Key to Professional Success (June 12)

Medical School Overview (June 13)

[High School-Summer Internship Program] High School Summer Intern Orientation (June 13 & 24)

Postbac Seminar Series (June 18)

Graduate School Overview: Much of What You Need to Know to Get In (June 20)

[High School-Summer Internship Program] Debriefing: First Week of HS-SIP (June 21)

Ethics in Research Training for Summer Interns (June 26)

Summer Networking Event: Get Cool and Get Connected—Popsicles! (June 28)



June Announcements

MENTOR OF THE YEAR AWARDS: ACCEPTING NOMINATIONS NOW!

Do you have an outstanding mentor?

The time has come for you to nominate your fellow or PI for the 2019 NICHD Mentor of the Year Awards. This is your chance to recognize an individual in the Division of Intramural Research (DIR) or Division of Intramural Population Health Research (DIPHR) whose mentoring has made a difference in your life at the NIH!

Below is the link to obtain information about the NICHD's two annual intramural Mentor of the Year Awards, one for a **fellow** and one for an **investigator**. Please submit your nomination form and a 500-word (maximum) narrative electronically to Dr. Erin Walsh (erin.walsh@nih.gov). **The submission deadline is Monday, July 29, 2019.**

Please contact the Office of Education if you have any questions about the nomination instructions or selection process.

<https://science.nichd.nih.gov/confluence/display/fellows/Mentor+of+the+Year+Awards>



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June Announcements

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CONGRATS TO OUR 2019 NICHD BEST POSTBAC POSTER WINNERS

During the 2019 Postbac Poster Day on May 2, 2019, NICHD postdocs and graduate students selected the postbac poster presentations from our institute that scored within the top 25 percent. The judging criteria were based on the fellow's knowledge of the lab's research, the fellow's ability to describe the project clearly, and the design and layout of the poster, highlighting hypothesis-driven questions.

Congratulations to the 2019 NICHD "Best" postbac poster winners!

- | | |
|--------------------|-------------------------|
| » Sophie Bice | » Richard Pan |
| » Angelique Ealy | » LauraAnn Schmidberger |
| » Alexandra Fister | » Mai-Han Trinh |
| » Sarah Frail | » Sanan Venkatesh |
| » Mitchell Lee | » Josette Wlaschin |
| » Brooke Meader | » Joseph Yano |
| » Jacob Noeker | » Mojgan Yazdankhah |

THE 2019 NIH-WIDE AWARDS FROM POSTBAC POSTER DAY

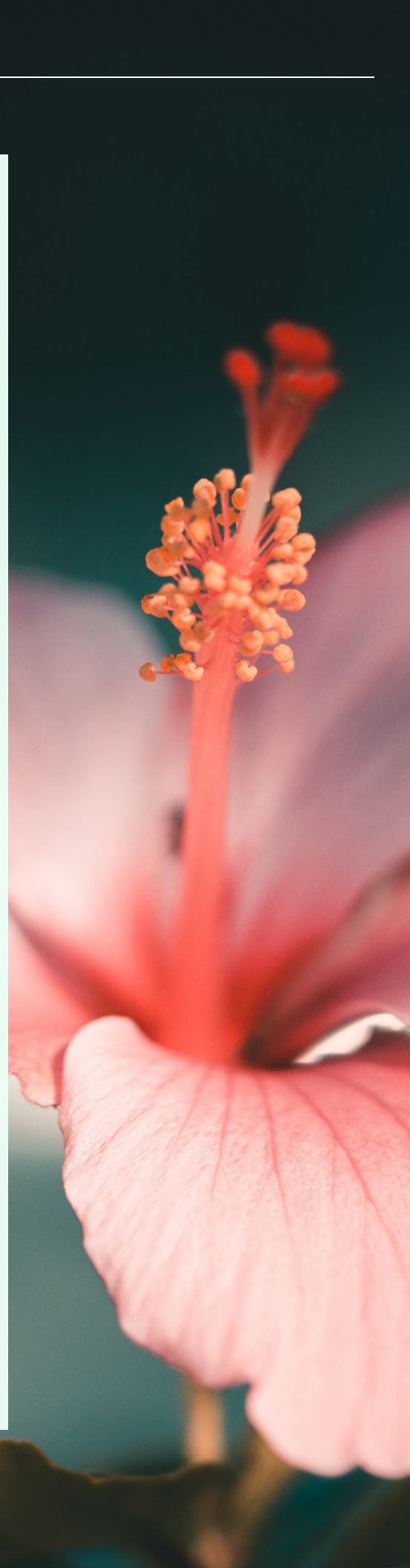
Congratulations to our postbacs who received an **Outstanding Poster Award** during the NIH-wide competition, hosted by the Office of Intramural Training and Education, during the 2019 Postbac Poster Day. The following NICHD postbacs authored posters that scored in the top 20 percent of all posters presented.

- | | |
|--------------------|-------------------------|
| » Marie Cronin | » Ross Kaufhold |
| » Joy Cui | » Mandy Lai |
| » Caroline Donahue | » Mitchell Lee |
| » Ariel Eraso | » Brooke Meader |
| » Alexandra Fister | » Jacob Noeker |
| » Sarah Frail | » Constandina O'Connell |
| » Ryan Gober | » LauraAnn Schmidberger |
| » Kathryn Johnston | » Ndhea Terry |
| » Jenna Kanner | » Gerard Walker |

To see award recipients from other institutes, please visit

https://www.training.nih.gov/postbac_poster_day_awards_no_year.

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June Announcements

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NICHD POSTBACS ON THE MOVE!

We are pleased to announce that our postbacs will attend a number of professional schools this coming school year.

Big congratulations to our postbacs on a job well done. Check out where they will be heading:

MD & DO PROGRAMS	MS & PHD PROGRAMS	MD/PHD PROGRAM
George Washington University	NIH-Johns Hopkins Graduate Partnership Program	University of Massachusetts
University of Iowa Carver College of Medicine	University of Arizona	University of Miami
University of South Florida Morsani School of Medicine	University of Michigan	Virginia Commonwealth University
Kansas City University	Duke University	
	Thomas Jefferson University	
	Emory University	
	Stanford University	
	Mount Sinai Icahn School of Medicine	
	Northeastern University	
	Columbia University Teachers College	

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June Announcements

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SUMMER WORKSHOPS, SAVE THE DATES!



INFORMATIONAL SESSION FOR FUTURE PRAT APPLICANTS

Wednesday, July 10, 1:00 – 3:00 p.m.

Building 31, Room 2A48

The NIGMS Postdoctoral Research Associate (PRAT) Program supports postdoctoral fellowships within the NIH Intramural Research Program. Applicants must be citizens or permanent residents of the United States with no more than two years of postdoctoral experience at NIH by the time of appointment to the PRAT program. **The deadline is October 3.** More information about the program can be found at <http://www.nigms.nih.gov/Training/Pages/PRAT.aspx>.

Postdoc applicants must now apply with the NIH Fi2 funding mechanism, and all applications must be submitted via grants.gov.

If you are planning to apply, the Office of Education is offering this session to discuss in detail how to prepare for the application submission, and more importantly, provide you with some valuable documents.

Please email Dr. Erin Walsh (erin.walsh@nih.gov) if you plan to attend.

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June Announcements

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SUMMER WORKSHOPS, SAVE THE DATES!

FACULTY POSITIONS: OPTIONS BEYOND THE TRADITIONAL

Tuesday, July 23, 10:00 – 11:30 a.m.

This two-part seminar will be led by Dr. Sydella Blatch. Dr. Blatch was an associate professor of biology at a primarily undergraduate institution and recently transitioned to a career in science administration, now working in the NIAID intramural training office.

As grad students and postdocs, we get a lot of exposure to research-based faculty positions, but what other kinds of faculty jobs are out there? Come to one or both parts of this seminar to learn about academic faculty positions that vary based on their emphasis in teaching, research, and institutional service.

Part I (60 min): Find out what it can be like for faculty at mid-sized and small universities, liberal arts and community colleges, and other kinds of faculty appointments at research-intensive universities such as lecturers and research professors.

Part II (30 min): Learn what kinds of experience and skills in teaching, research, and service make applicants competitive for these types of faculty positions. Discover what you can work on now and ways to convey your skills in the job application.

Please contact Dr. Erin Walsh (erin.walsh@nih.gov) if you plan to attend.

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June Announcements

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SUMMER WORKSHOPS, SAVE THE DATES!

GRANT WRITING WORKSHOP

Monday, August 12, 9:00 a.m. – 4:00 p.m.

This workshop will be led by [Grant Writing Mentors](#), a team of experts with careers in academic research, grant writing and peer review, grants management, federal policy, and scientific writing. Mentors will address both practical and conceptual aspects that are important to the proposal writing process, including how NIH research grant proposals are prepared and reviewed.

Specific topics to be covered include:

- » Thinking strategically about your career
- » Using RePORTER to search for funding information from funding sources such as the NIH
- » Understanding Funding Opportunity Announcements with a focus on the K22/K99
- » Peer review and how funding decisions are made
- » Key elements of a successful grant application

There will also be four afternoon breakout sessions:

- » Physician Scientists—the Rewards and Challenges
- » Writing Your Specific Aims
- » Mapping Your NIH Research Career
- » 10 Writing Rules to Increase Your Chances for Funding

There are only 15 slots for NICHD fellows. If you would like to register, please email Dr. Erin Walsh (erin.walsh@nih.gov).

PUBLIC SPEAKING WORKSHOP: GIVING SCIENTIFIC TALKS

Monday, August 19, 1:00 – 3:00 p.m.

“Speaking about Science” is a highly interactive workshop led by public speaking coach Scott Morgan. The core of this workshop is a nine-step preparation process that ensures a clear and engaging talk for a variety of audiences. Learn strategies for improving your delivery of lab talks or giving presentations at big meetings.

Topics include: presenting data, identifying theme and focus, creating effective visual aids, and beginning and ending a talk. Participants in this program will also have the opportunity to schedule an individual one-hour coaching session prior to a scheduled presentation.

To register for this workshop, please email Dr. Erin Walsh (erin.walsh@nih.gov).

June Events

MONDAY, JUNE 10, 1:00 – 3:00 PM

Grant Writing Session for IRF Applicants
Building 31, Room 2A48

In 2018, DIR launched the **Intramural Research Fellowship (IRF)**, a competitive research funding opportunity for NICHD postdoctoral, visiting, and clinical fellows. Its main objective is to promote grant writing among our intramural trainees, while enhancing awareness of the various components of an NIH grant application. For all prospective applicants, the Office of Education will offer a training session to cover various components of an NIH grant, details about the application and review processes, and tips on preparing an IRF application.

The IRF submission date is Monday, September 9, 2019.

Attendance at this training session is a requirement for submission. For more information on the IRF, please visit [NICHD Intramural Research Fellowship](#).

THURSDAY, JUNE 27, 10:00 AM – 12:00 PM

Three-minute-Talk (TmT) Program: The 2019 Final Competition
Lipsett Auditorium

*Imagine describing your research in less than three minutes.
See how it's done!*

We would like to invite everyone to our final TmT event for 2019, where our NICHD finalists will present their research stories with others from NHGRI, NIDCR, NIAMS, NEI and NCATS, while competing for 1st, 2nd, and 3rd place in the competition.

